

WHAT IS CLAIMED IS:

1. A method of electrochemically and mechanically planarizing a surface of a substrate, comprising:
 - (a) providing a basin containing an electrically conductive solution and an electrode disposed therein;
 - (b) disposing a polishing medium in the electrically conductive solution;
 - (c) positioning a substrate against the polishing medium so that a surface of the substrate contacts the electrically conductive solution;
 - (d) applying a first potential between the polishing medium and the electrode for a first time period; and
 - (e) applying a second potential between the polishing medium and the electrode for a second time period.
2. The method of claim 1, wherein the second potential is a zero potential.
3. The method of claim 1, wherein the second potential is lower than the first potential.
4. The method of claim 1, wherein the first potential is a pulsed potential with a waveform.
5. The method of claim 1, wherein the first potential is a pulsed potential with a waveform and the second potential is a pulsed potential with a waveform.
6. The method of claim 1, wherein the first potential is a pulsed potential with a waveform and the second potential is a pulsed potential with a waveform and a negative polarity.
7. The method of claim 1, wherein the first potential is a pulsed potential with a waveform and the second potential is a zero potential.

8. The method of claim 1, wherein the first potential is modulated within a predefined range of potentials.
9. The method of claim 1, wherein the second potential is modulated within a predefined range of potentials.
10. The method of claim 1, further comprising repeating steps (d) and (e) for a third time period.
11. The method of claim 1, wherein applying the first potential comprises:
applying a third potential between the polishing medium and the electrode for a third time period; and
applying a fourth potential between the polishing medium and the electrode for a fourth time period.
12. The method of claim 11, wherein the third potential is a pulsed potential with a waveform and the fourth potential is a pulsed potential with a waveform.
13. The method of claim 1, wherein applying the second potential comprises:
applying a third potential between the polishing medium and the electrode for a third time period; and
applying a fourth potential between the polishing medium and the electrode for a fourth time period.
14. The method of claim 13, wherein the third potential is a pulsed potential with a waveform and the fourth potential is a pulsed potential with a waveform.
15. The method of claim 1, wherein the first time period is greater than the second time period.

PATENT

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16. The method of claim 1, further comprising applying a third potential between the polishing medium and the electrode for a third time period.

17. The method of claim 16, wherein the third potential is a pulsed potential with a waveform.

18. The method of claim 16, wherein the first potential is a pulsed potential with a waveform, the second potential is a pulsed potential with a waveform, and the third potential is a pulsed potential with a waveform.

19. The method of claim 1 further comprising
(f) applying a third potential between the polishing medium and the electrode for a third time period; and
repeating steps (d) through (f) for a period of time.